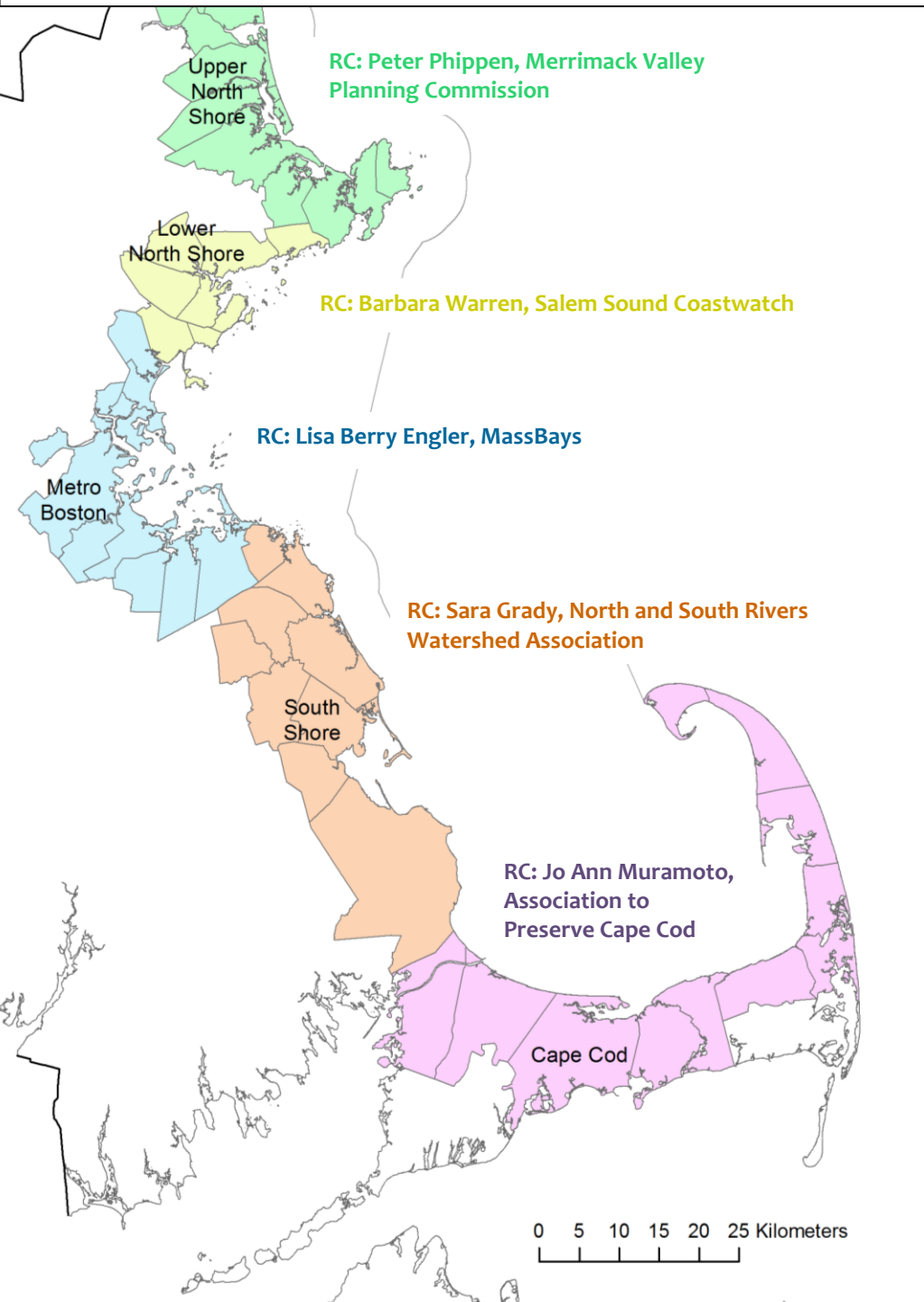


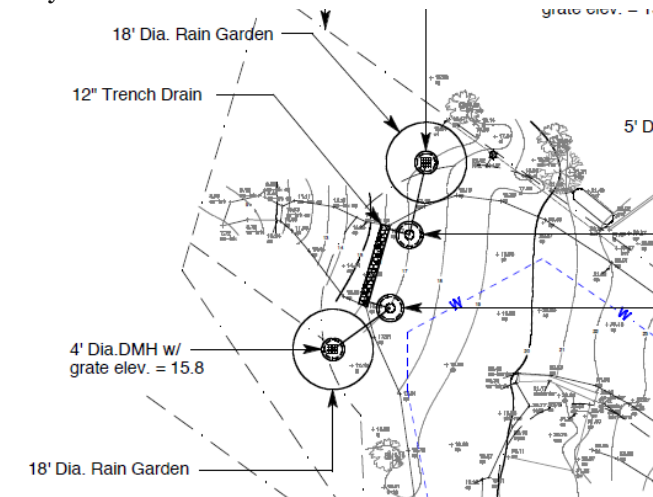
MassBays can provide a range of support to municipal officials to improve water quality in Massachusetts Bay and Cape Cod Bay estuaries. Through MassBays, you'll gain technical support from our Regional Coordinators (RCs), access embayment-specific water quality assessments and planning documents, and find connections to state and federal funding agencies. Visit www.massbays.org for more.



Bringing Green Infrastructure to Your Community

Stormwater runoff is one of the largest sources of pollution in Massachusetts coastal waters. When rain hits rooftops, parking lots and roads, polluted runoff often ends up in storm drains and is sent directly to local waterways. Pollution in our coastal waters – excess nutrients, sediment, and chemicals – compromises natural habitats, including shellfish beds, wetlands, and eelgrass that serve as nurseries for fish.

In contrast to storm drains that transport polluted runoff to the coast via an express lane, **Green infrastructure practices** mimic natural habitats like wetlands, holding excess water in place, and filtering out most pollutants before they reach our waterways.



Green infrastructure not only improves water quality – compared with conventional approaches, municipalities can expect multiple other benefits, including:

- Increased property values.
- Improved water quality.
- Reduced municipal water use.
- Ground water recharge.
- Flood risk mitigation.
- Increased resilience to heavier rainfall, hotter temperatures, and higher storm surges associated with climate change.
- Increased recreation space.
- Improved community aesthetics.
- Reduced air temperatures in developed areas.
- Increased or improved wildlife habitat.
- Cost savings.
- Green jobs.

Federal and State regulations support green infrastructure

Employing green infrastructure, coastal cities and towns get a head start on meeting regulatory requirements for stormwater treatment and control:

- EPA's 2014 draft stormwater permit for Massachusetts requires evaluation of low impact development (LID or green infrastructure) alternatives, and policies to support their installation. (http://www.epa.gov/region1/npdes/stormwater/MS4_MA.html)
- The Massachusetts Wetlands Protection Act/401 permits require consideration of LID or green infrastructure approaches, including in coastal wetlands and buffer zones. (<http://www.mass.gov/eea/agencies/massdep/water/wastewater/stormwater.html>)



At a Glance: Coastal Stormwater Management through Green Infrastructure

EPA and MassBays have teamed up to produce a handbook documenting one successful approach to applying green infrastructure in the MassBays region. In addition to a technical Appendix, it contains:

Chapter 1, Introduction and Background

Contents: Regulatory requirements related to stormwater management, conditions in the geographic region, green infrastructure concepts, and a municipal case study.

Chapter 2, Watershed Assessment

Contents: A general process for performing a watershed assessment to identify locations where implementing green infrastructure will have the greatest impact on water quality.

Identify stakeholders and roles.
Identify study watershed or subwatershed.
Identify existing hydrologic and hydraulic data.
Characterize known pollutant loadings.
Identify existing BMPs and green infrastructure practices.

Chapter 3, Identifying Green Infrastructure Opportunities

Contents: Considerations in identifying high-priority locations for green infrastructure practices.

Identify target subwatershed(s).
Complete primary screening of potential BMP locations.
Complete secondary screening and prioritization.

Chapter 4, Site Assessment, Planning, and Design

Contents: A step-wise process for site planning, development, green infrastructure siting, and sizing to incorporate green infrastructure concepts and goals once a site has been identified.

Review site planning and design principles.
Incorporate green infrastructure principles and concepts in a site design.
Prepare conceptual design plans.

Chapter 5, Green Infrastructure Practices

Contents: Survey of green infrastructure practices with guidance on selecting the appropriate practice(s) for a selected site.

Use “BMP Selection Matrix” to select green infrastructure BMPs.
Size green infrastructure BMPs.
Utilize resources referenced to develop a full design.
Consider potential BMP construction and post-construction issues.

Chapter 6, Green Infrastructure Review Process

Contents: A process to ensure that relevant and necessary information is provided in the design plans.

Incorporate a process for reviewing and approving green infrastructure.
Provide incentives to encourage green infrastructure.

A Municipal Case Study

Historically, Kingston Bay harbored a thriving shellfishing industry. But over time, deteriorating water quality resulted in restrictions on shellfish harvesting. To restore what once was, the town of Kingston applied for and received funding from MassBays in 2011 to evaluate the feasibility of installing green infrastructure at stormwater outfalls that discharge into the Jones River and Kingston Bay.



Before (above) and after (right) rain garden installation in Kingston MA. Photos courtesy of Maureen Thomas

Beginning with 35 known stormwater outfalls to the Jones River, the town identified a subset at which to perform water quality sampling during two storm events. Water samples were analyzed for bacterial contamination and total suspended solids. Based upon the results of the sampling, local site conditions, and proximity of the site to the Bay, BMPs for 10 of the sites were brought to a conceptual design stage. Since 2012, detailed engineering designs have been developed for the most promising sites with funding from the state Office of Coastal Zone Management, and two BMPs are now in place.



Additional Resources

The handbook provides lists of funding opportunities and information resources. For example:

Funding: CZM Coastal Pollutant Remediation Grants (www.mass.gov/eea/agencies/czm/program-areas/coastal-water-quality/cpr/); DEP §319 Grant Program (www.mass.gov/eea/agencies/massdep/water/grants/watersheds-water-quality.html#2); DEP 604b Grant Program (<http://www.mass.gov/eea/agencies/massdep/water/grants/watersheds-water-quality.html#3>)

Public education: Soak up the Rain (www.epa.gov/region1/soakuptherain); Greenscapes (Greenscapes.org); Nonpoint Source Toolbox(cfpub.epa.gov/npstbx/index.html)

Technical information: EPA (water.epa.gov/infrastructure/greeninfrastructure/index.cfm#tabs-1); DEP (<http://www.mass.gov/eea/agencies/massdep/water/wastewater/stormwater.html>); University of New Hampshire Stormwater Center (www.unh.edu/unhsc/)